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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,424	01/10/2002	Yasuhiro Yoneda	217771USOPCT	3839
22850	7590	06/02/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER

1765

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/030,424

Applicant(s)

YONEDA, YASUHIRO

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9, 11-20, 28-30 and 38-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 11-20, 28-30, and 38-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. The previous rejection has been withdrawn because the former prior art of record failed to teach: A polishing liquid composition comprising:  $R^1-X-(CH_2)_q-[CH(OH)]_n-CH_2OH$  (I), along with the rest of the limitations, as recited in (Original) Claim 1; and the amine that is represented by formula (II), (Previously Presented) Claim 6.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kriltz (DD 249489A).

Kriltz teaches a chemical and mechanical cleaning and polishing composition consisting of aqueous iron (III) salt solutions containing alcohols and aggressive media. The alcohols may be primary, secondary or tertiary alcohols, diols or triols. The aforementioned reads on,

A polishing liquid composition comprising:  $R^1-X-(CH_2)_q-[CH(OH)]_n-CH_2OH$  (I)  
as specified in **claim 1**.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2-4, 7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kriltz (DD '489 A) as applied to claim 1 above

Kriltz differs in failing to teach wherein the organic acid is an etching agent, in **claims 2 and 3**; further comprising an etching agent comprising an inorganic acid, in **claim 4**, and further comprising an oxidizing agent and abrasive, in **claims 7 and 11**.

Using organic and inorganic acids as etchants and for adjusting pH of polishing compositions and using oxidizing agent and abrasive in polishing compositions are known. Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to employ inorganic and organic acids as etchants, oxidizing agent, and abrasive since they are known to be effective in polishing semiconductor materials.

***Claim Rejections - 35 USC § 102***

7. Claims 5, 12, 28, 29, and 38-42 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kaufman (US '489).

As to claims 5, 12, and 38-42, In Kaufman's Description of the Art, "In a typical process, via holes are etched through an interlevel dielectric (ILD) to interconnection lines . . . Next, a thin adhesion layer . . . is generally formed over the ILD and is directed into the etched via hole. Deposition is continued until the via hole is filled with the blanket deposited metal. Finally, the excess metal is removed by chemical mechanical polishing (CMP) to form metal vias" (column 1, lines 49-54 and 56-59). Kaufman also teaches, "A chemical mechanical polishing slurry comprising at least two oxidizing agents, an organic acid and an abrasive . . ." (Abstract). ". . . A wide range of conventional organic acids, salts or organic acids, and mixtures thereof are useful in the CMP slurry of the present invention to enhance the selectivity of oxide polishing rate. . . . Preferably the organic acid is selected from the group of acetic acid (same as applicant's organic etching acid), . . . lauric acid, . . . myristic acid, . . . palmitic acid, . . .

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propionic acid, . . . stearic acid (same as applicant's aliphatic carboxylic acid having 7 to 24 carbon atoms), . . ." (column 6, lines 7-14). "The CMP slurry may be produced using techniques known to those skilled in the art. Typically, the oxidizing agent and any optional additives, are mixed into the aqueous medium, such as deionized or distilled water, . . ." (column 7, lines 55-61). Kaufman further teaches, "The organic acid or salt should be present in the final CMP slurry, individually or in combination with other organic acids or salts, . . ." (column 6, lines 15-19). The aforementioned reads on,

A polishing liquid composition for polishing a surface to be polished comprising an insulating layer and a metal layer, the polishing liquid composition comprising:

an aliphatic carboxylic acid having 7 to 24 carbon atoms, an etching agent comprising an organic acid, and water, wherein the organic acid of the etching agent is at least one selected from the group consisting of A: aliphatic organic acids having 6 or less carbon atoms and one to three carboxyl groups, wherein the metal layer includes copper or copper alloys (column 7, lines 41-45), **in claims 5 and 38;**

an oxidizing agent, an abrasive or a mixture thereof, **in claims 12 and 39;** and  
polishing a surface using the polishing liquid of claim 38, **in claim 40.**

Kaufman also teaches, a chemical mechanical polishing slurry that comprises an abrasive, oxidizing agents, organic acid (same as applicants' etching agent and aliphatic carboxylic acid having 7 to 24 carbon atoms) and other optional ingredients (column 3, lines 41-43 and 56-59) and the CMP slurry may be produced by mixing the oxidizing agent and any optional additives into deionized wafer along with a

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concentrated dispersion of a metal oxide abrasive (column 7, lines 55-64 and column 6, lines 15-19), which reads on,

mixing an aliphatic carboxylic acid having 7 to 24 carbon atoms and/or a salt thereof, an etching agent, an oxidizing agent and water; and producing the polishing composition of claim 38, **in claims 28, 29 and 42.**

***Claim Rejections - 35 USC § 102***

8. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Tytgat et al. (US 5,209,820).

Tytgat teaches baths for chemical polishing stainless steel surfaces which comprise a mixture of hydrochloric, nitric and phosphoric acid (which are known etching agents and oxidizing agents, a substituted or unsubstituted hydroxbenzoic acid and an amine in aqueous solution (Abstract) and the amine can be a tertiary amine and comprise more than 10 carbon atoms (column 2, lines 1-4). The aforementioned reads on,

A polishing liquid composition comprising an amine, as represented by general formula (II), an etching agent, an oxidizing agent, and water. Since Tytgat teaches the same polishing composition as claimed by applicants, then using Tytgat's composition in the same manner as in the claimed invention would inherently result in a polishing liquid composition for polishing a surface to be polished comprising an insulating layer and a metal layer.

***Claim Rejections - 35 USC § 103***

9. Claims 13 and 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tytgat (US '820) as applied to claim 6 above, and further in view of Mahulikar (US 6,447,563)

Tytgat differs in failing to teach the polishing composition further comprising an abrasive in combination with an oxidizing agent or a mixture thereof, **in claim 13**; and mixing an amine compound, an etching agent, an oxidizing agent and water; and producing the polishing liquid composition of claim 6, **in claim 30**.

Mahulikar teaches a CMP slurry for use in semiconductor manufacturing and that comprises an oxidizer, acids, amines and mixture thereof (Abstract and claim 27). The reference of Mahulikar is cited to illustrate that mixing an oxidizing agent and abrasive in polishing compositions is known. Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to employ an oxidizing agent and abrasive as taught by Mahulikar along with Tytgat's polishing composition since they are known to be effective in polishing semiconductor materials.

***Response to Arguments***

10. Applicant's arguments with respect to claims 1-7, 9, 11-20, 28-30, and 38-42, have been considered but are moot in view of the new ground(s) of rejection because the former prior art of record failed to teach: A polishing liquid composition comprising:  $R^1-X-(CH_2)_q-[CH(OH)]_n-CH_2OH$  (I), along with the rest of the limitations, as recited



(Original) Claim 1; and a polishing liquid composition comprising an organic acid as specified in (New) Claims 38-42

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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May 20, 2005

NADINE G. NORTON  
SUPERVISORY PATENT EXAMINER  
